

Lean 6-Sigma

Caltrans & Continuous Improvement

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Goal 5: Organizational Excellence

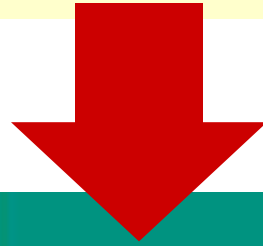
Lean 6-Sigma Overview

1. Why Lean 6-Sigma?
2. What is Lean 6-Sigma?
3. Lean vs. 6-Sigma
4. Lean Principles & Tools
5. Lean 6-Sigma

WHY **Lean 6-Sigma?**

- L6S is a methodology, a way to improve processes
- Continuous Improvement
- Finding new and better ways of doing things
- Innovation
- Culture of Sustainability

Challenge the Process



Mission

“Provide a safe, sustainable, integrated and efficient transportation system to enhance California’s economy and livability.”



Vision & Values

“ A performance-driven, transparent and accountable organization that values its people, resources and partners, and meets new challenges through leadership, innovation and teamwork.”



Our Mission

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

Safety and Health

Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities.

Stewardship and Efficiency

Money counts. Responsibly manage California's transportation-related assets.

Sustainability, Livability and Economy

Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.

System Performance

Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

Organizational Excellence

Be a national leader in delivering quality service through excellent employee performance, public communication, and accountability.

Our Vision

A performance-driven, transparent and accountable organization that values its people, resources and partners, and meets new challenges through leadership, innovation and teamwork .

Integrity ■ Commitment ■ Teamwork ■ Innovation

Unpacking our Caltrans Vision

Performance Driven

L6S helps us to be Performance Driven, by improving and increasing our performance without additional resources. Also, because it is team-driven, it increases employee engagement, which fuels a performance-driven environment.

Transparent and Accountable

L6S helps make us Transparent and Accountable, because we document and communicate our processes.

Values our People, Resources and Partners

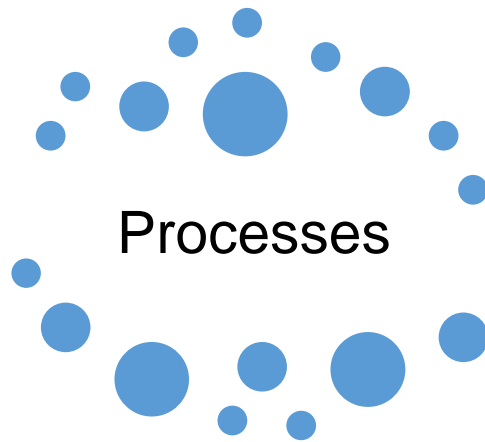
L6S helps us Value our People by listening to their ideas and solutions for process improvement. It helps us to value our Resources by eliminating wasteful practices, and to value our partners, because we include them in our process improvements—understanding that our processes impact them and are impacted by them.

Meets new Challenges through Leadership, Innovation & Teamwork

L6S helps us to meet challenges because our leadership has adopted L6S and recognizes the power of innovation and teamwork. L6S is an innovation process and it is always done through a team.

Why Focus on Process?

85%



85% of improvement opportunities are here

Customer Value

What is Lean 6-Sigma?

What Is **Lean** **Six Sigma**?



LEAN

Reduces waste
by streamlining a process.

+



SIX SIGMA

Reduces defects
by effectively solving problems.

=

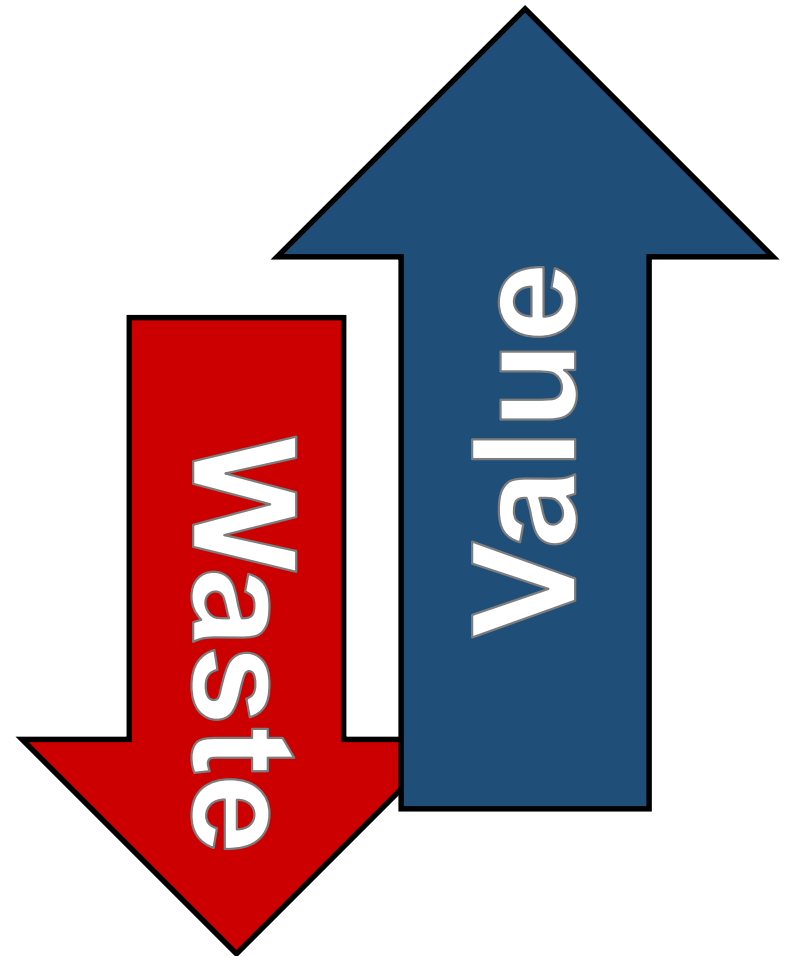


LEAN SIX SIGMA

LEAN accelerates SIX SIGMA;
Solving problems and improving processes
is faster and more efficient.

WHAT is Lean?

“A systematic method for the elimination of **waste** within a system to improve **value** to customers.”



Lean and Common Misconceptions

Lean is...

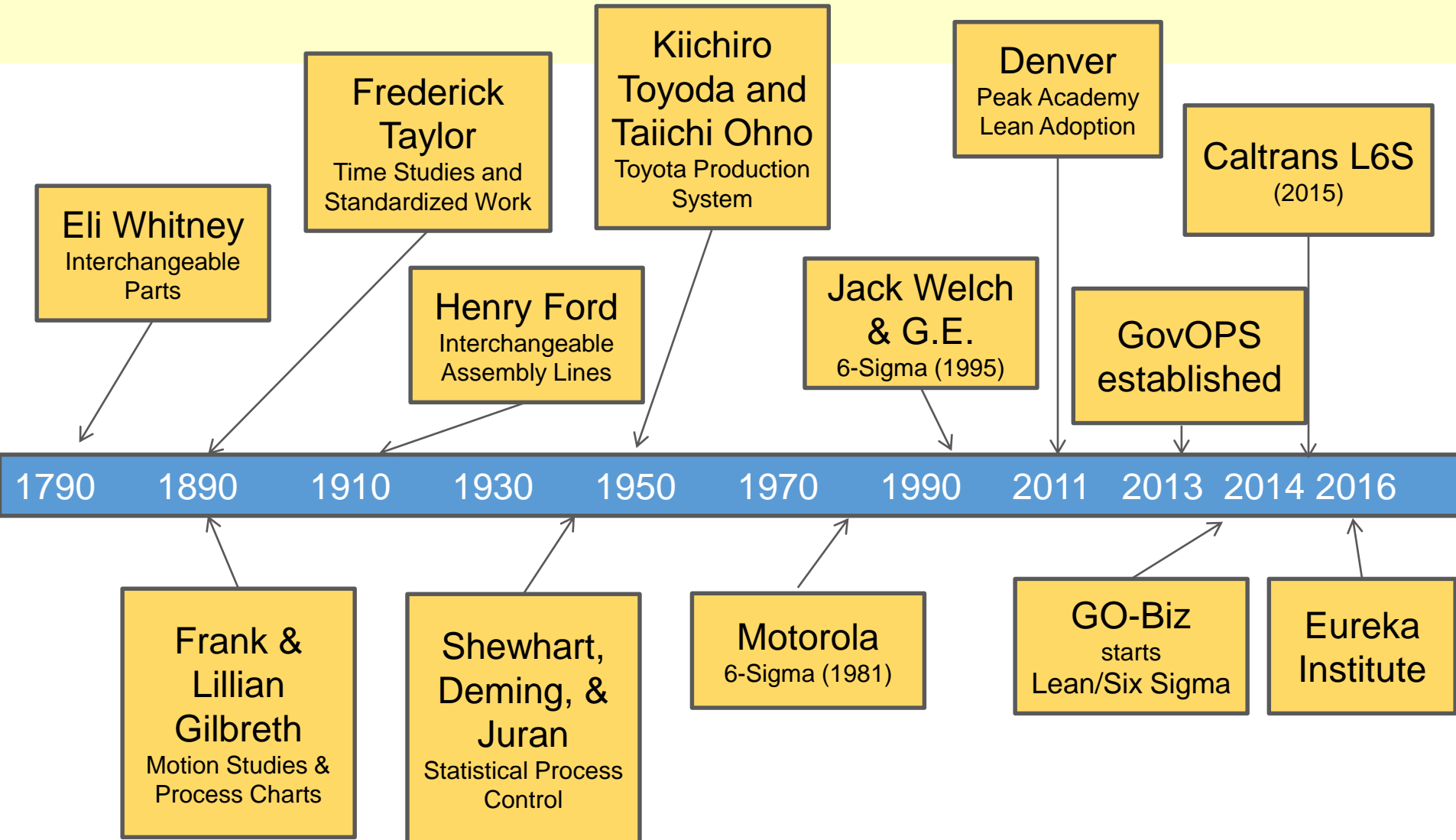
- A time-tested continuous improvement methodology
- Non-proprietary (i.e., free)
- Driven by the people who do the work (not top down)
- An investment in fellow employees
- A set of tools to identify and eliminate waste
- Always delivering value to the customer on demand

Misconceptions

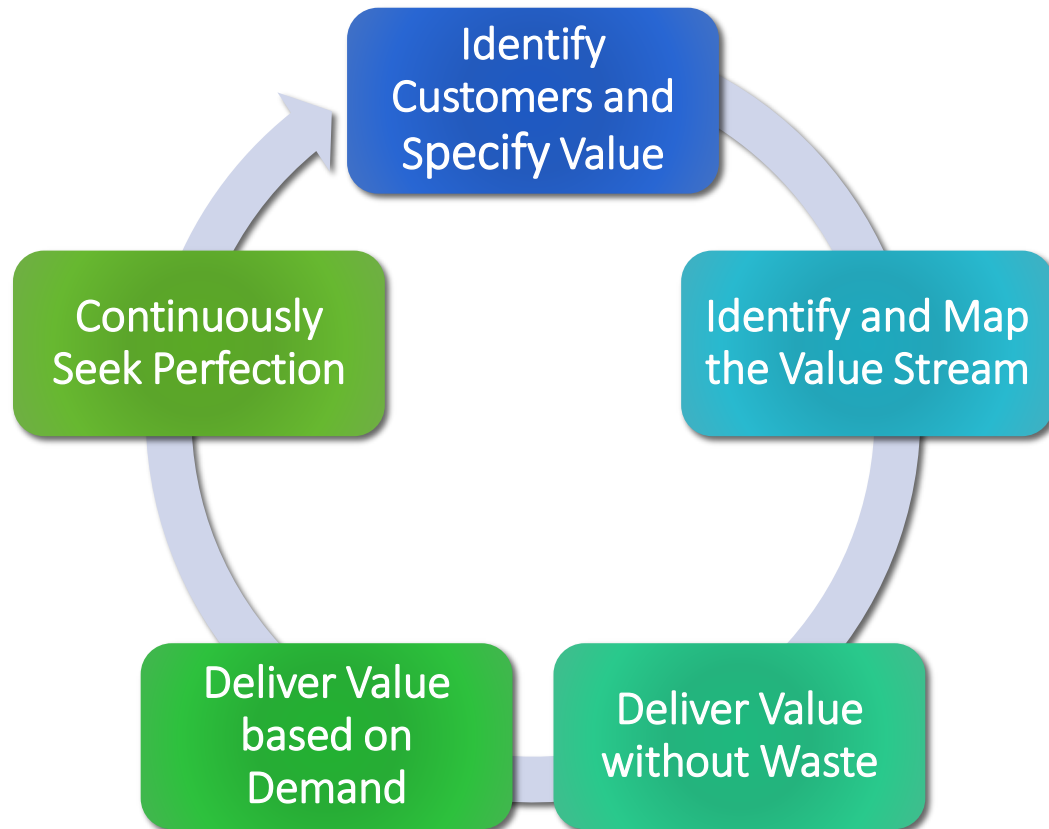
- An acronym (LEAN)
- A solution for personnel and performance issues
- An initiative to reduce staff
- A silver bullet or a quick fix
- A “manufacturing thing”

Lean does not require special expertise.

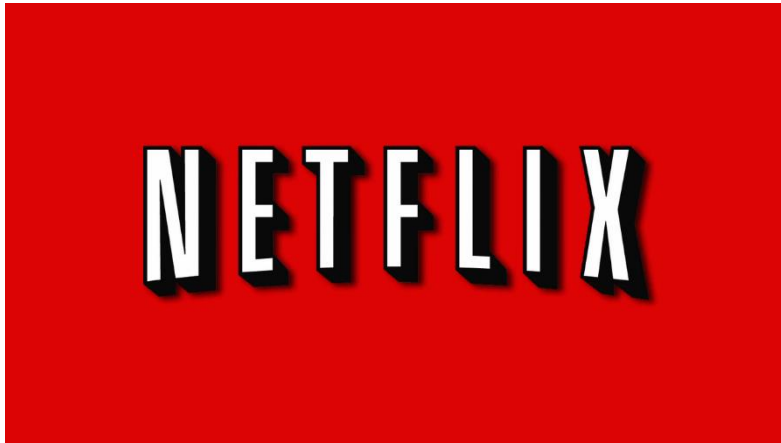
Lean & 6-Sigma Timeline



Five Principles of Lean



Delivering Value on Demand



Lean Tools

- PDCA – Plan, Do, Check, Act
- A3 – The Lean Storyboard
- Process Mapping & The Value Stream
- Value Added, Non-Value Added, BN-NVA
- The 8 Wastes
- Spaghetti Mapping
- The 5-S Tool
- Standard Work
- The 5 Why's – Root Cause Analysis




PDCA
DIAGRAM

The central text "PDCA DIAGRAM" is in white capital letters. Above it is a white line-art icon of a person, representing the human element in the process.

TITLE: _____

Team: _____

Date Started: _____ Current Date: _____

Executive Sponsor: _____

Process Owner: _____

P1

Why Change is Needed

Sample Questions

- Why are we doing this?
- What is the burning platform?
- What is the chief complaint?
- What is the impact of this issue?
- Intent of the action
- Scope – Start & end points

P4

Gap Analysis/Assumptions

- What holds us back from the Future State?
- What are the root causes of these road blocks?
- Use Tools to ID Waste
- Brainstorm

C6

Results

Result	30d	60d	90d
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

P2

Current State

Describe attributes of the current state:

- Quantitative
(Money/Errors/Amounts/Time)
- Qualitative

Graphically present picture of Current State

D5

Action Plan

Action Item	Assigned To	Date Completed

A7

Lessons Learned

Went Well/Helped	What didn't go well/Hindered

P3

Future State

Describe attributes of the future state:

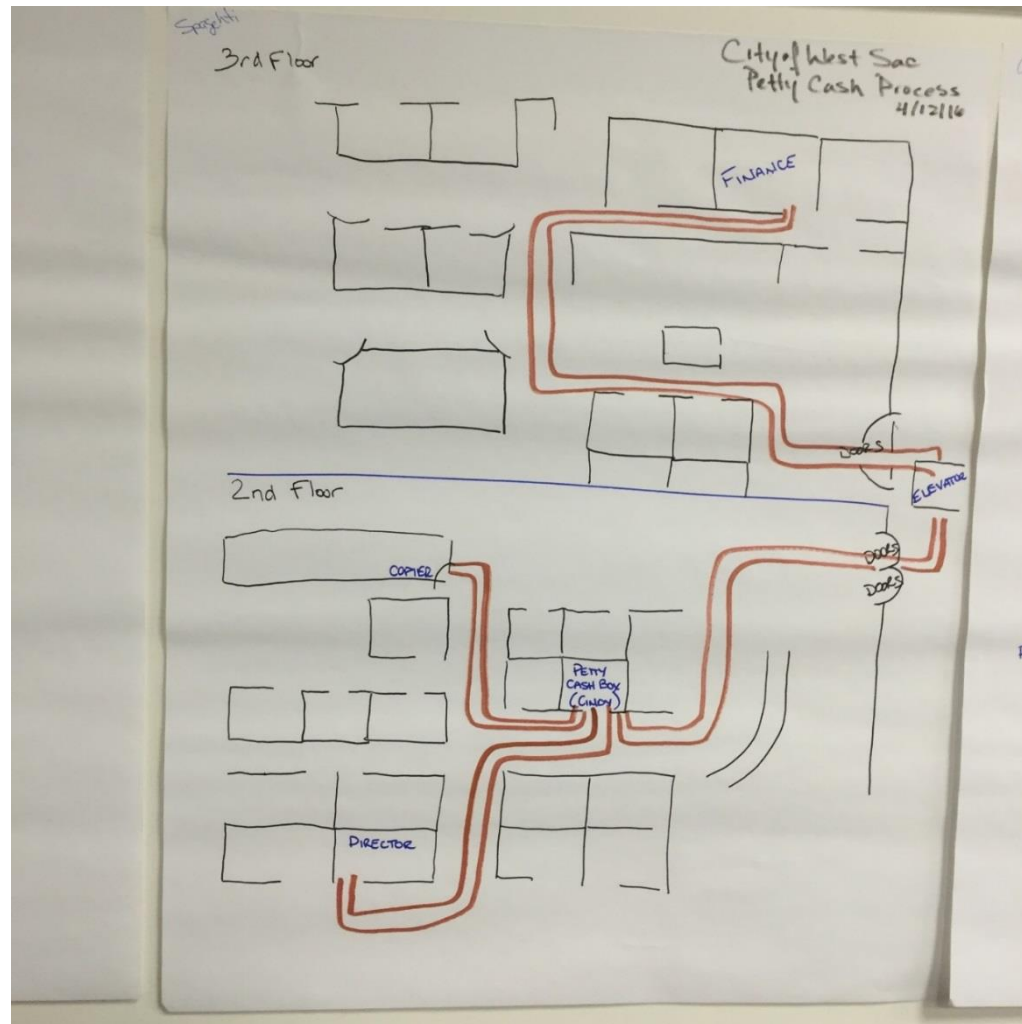
- Quantitative
 - Money/Errors/Amounts/Time
 - Are metrics defined and achievable?
- Qualitative

Graphically present picture of Future State

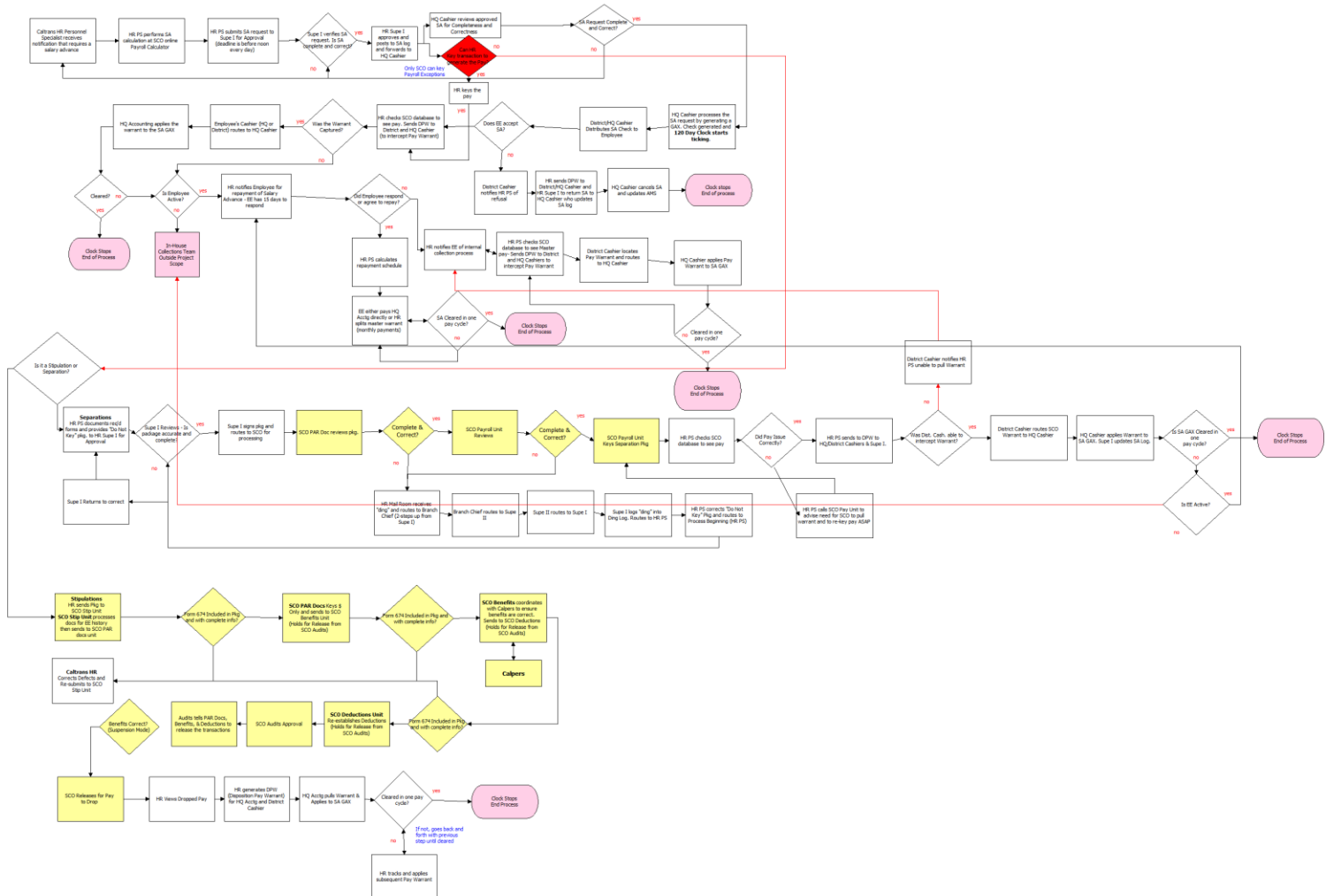
Benefits of the A3

- Aligns to and supports PDCA system
- Creates structure for your innovation projects
- A framework for organization
- Promotes transparency
- A visual charter of work and opportunities
- Communication tool– Tells the story!

Spaghetti Mapping



Process Mapping



Process Mapping

A process map is a graphic representation of the sequence of actions that comprise a process.

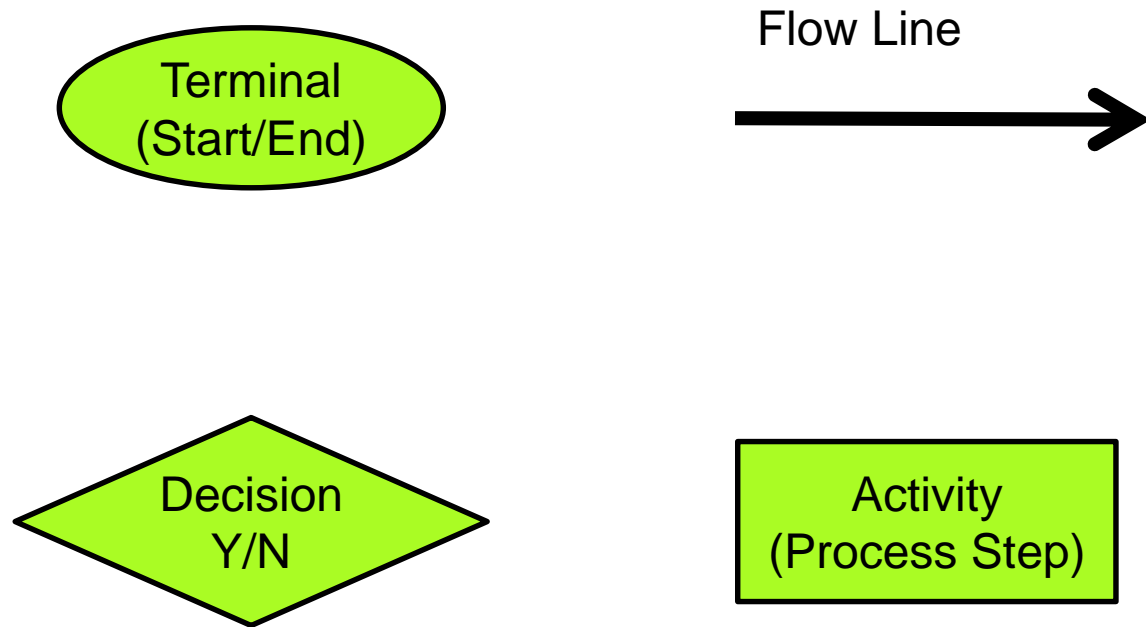
Process Maps are used to:

- Document processes
- Analyze and improve on processes
 - Look for value-added and non-value added steps
 - Eliminate waste

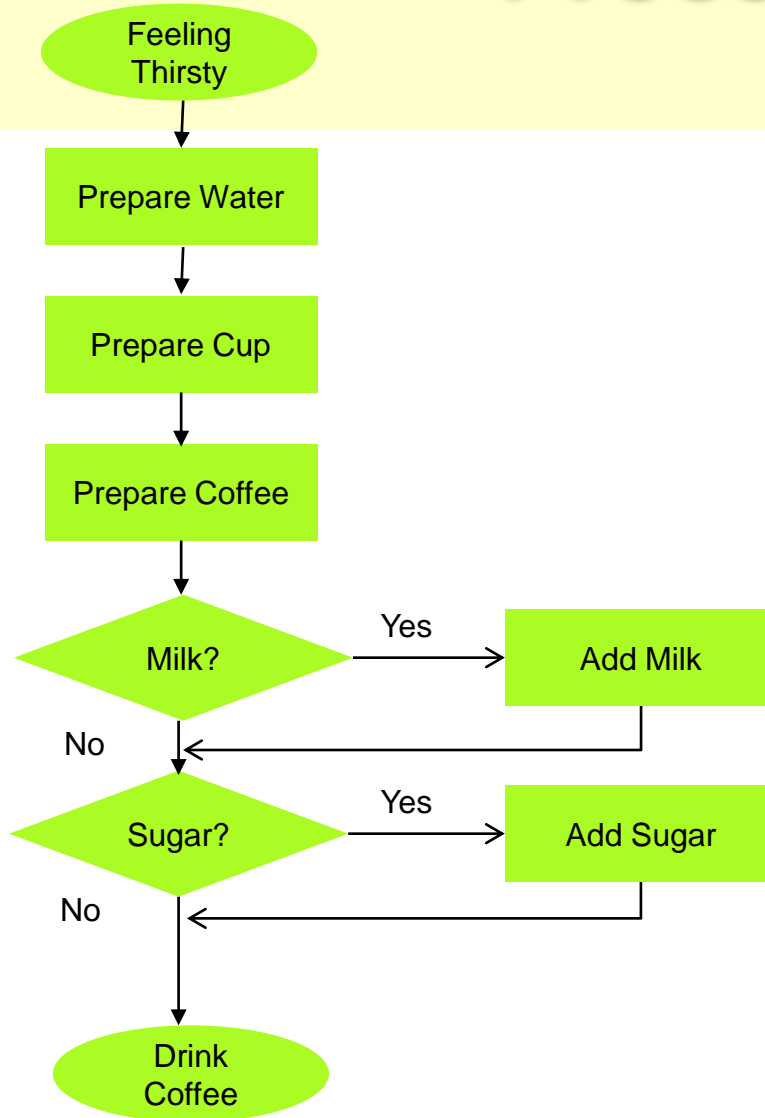
General Guiding Rules:

- Must have a defined scope
- Ensure information is accurate and reflects the work being done

How to Process Map - Shapes



Process Map Example



Process Mapping

Example with Post-Its



Caltrans, April 2016

Contributed by *Michael Berlanda*

*“If you can’t flow it—
You don’t know it!”*

Steps for Process Mapping

- **Assemble the Team**
- **Agree on the scope:**
 - Which process are you going to process map?
 - What is the purpose of the process?
 - What are the beginning and ending points?
 - What level of detail should be displayed?
- **Start by preparing a narrative outline of steps**
- **Ask (and encourage) lots of questions**

Is it Truly Value-Added?

Value Added

Any activity in a process that improves the product or service

Value Criteria:

- Transformational
- Deliver what the customer needs or wants
- Done right the first time, without error

Business Necessary NVA

Activities ensuring that value-added activities have been properly completed.

These are activities required by law, regulation, and/or policy.

Non-Value Added

Activities that do not contribute to the product or the process and should therefore be eliminated.

Non-value added activities are waste.

The 8 Wastes

To remember The 8 Wastes, you can use the acronym “DOWNTIME.”

D



DEFECTS

Efforts caused by rework, scrap, and incorrect information.

O



OVERPRODUCTION

Production that is more than needed or before it is needed.

W



WAITING

Wasted time waiting for the next step in a process.

N



NON-UTILIZED TALENT

Underutilizing talents, skills, & knowledge.

T



TRANSPORTATION

Unnecessary movements of products & materials.

I



INVENTORY

Excess products and materials not being processed.

M



MOTION

Unnecessary movements by people (e.g., walking).

E



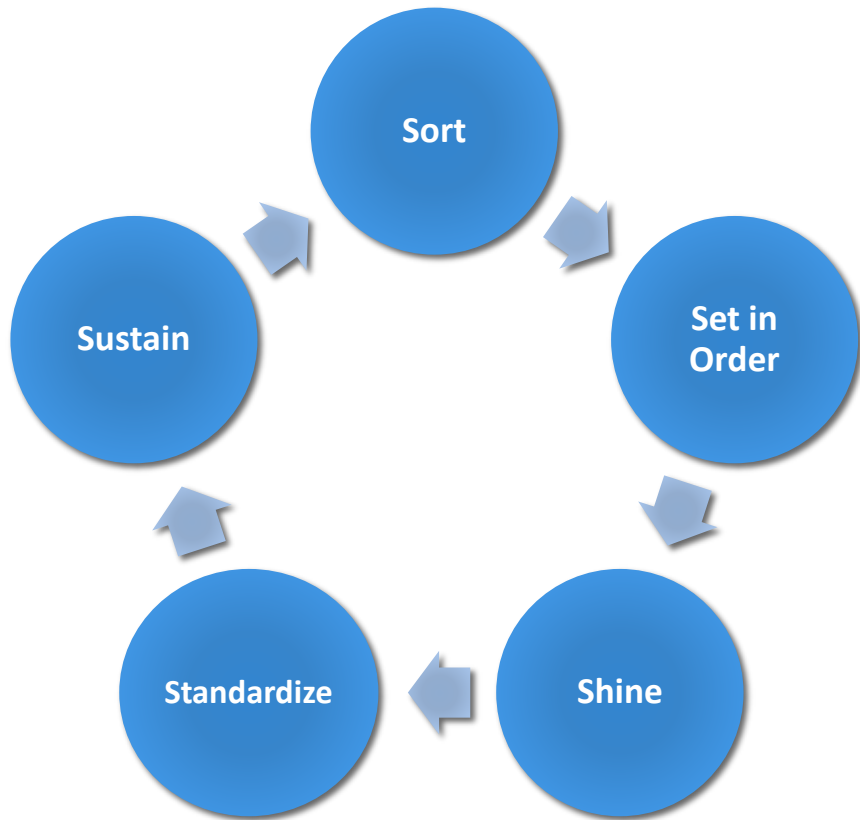
EXTRA-PROCESSING

More work or higher quality than is required by the customer.





The 5-S Tool



5-S is a technique to organize and sustain an environment in which:

- Everything has a place,
- is in its place,
- and is ready for use.

Standard Work

- Standard work is one of the most powerful Lean tools.
- Eliminates defects (waste) by applying best practices consistently.
- Documents current practices that serve as the baseline for further improvements.
- Helps train and guide team members.
- Makes processes sustainable (through EE turnover).
- Are Visual

Standard Work Examples

Standard Work Includes:

- Job Aids
- Checklists
- Forms
- Policy

[illegible]

Root Cause Analysis

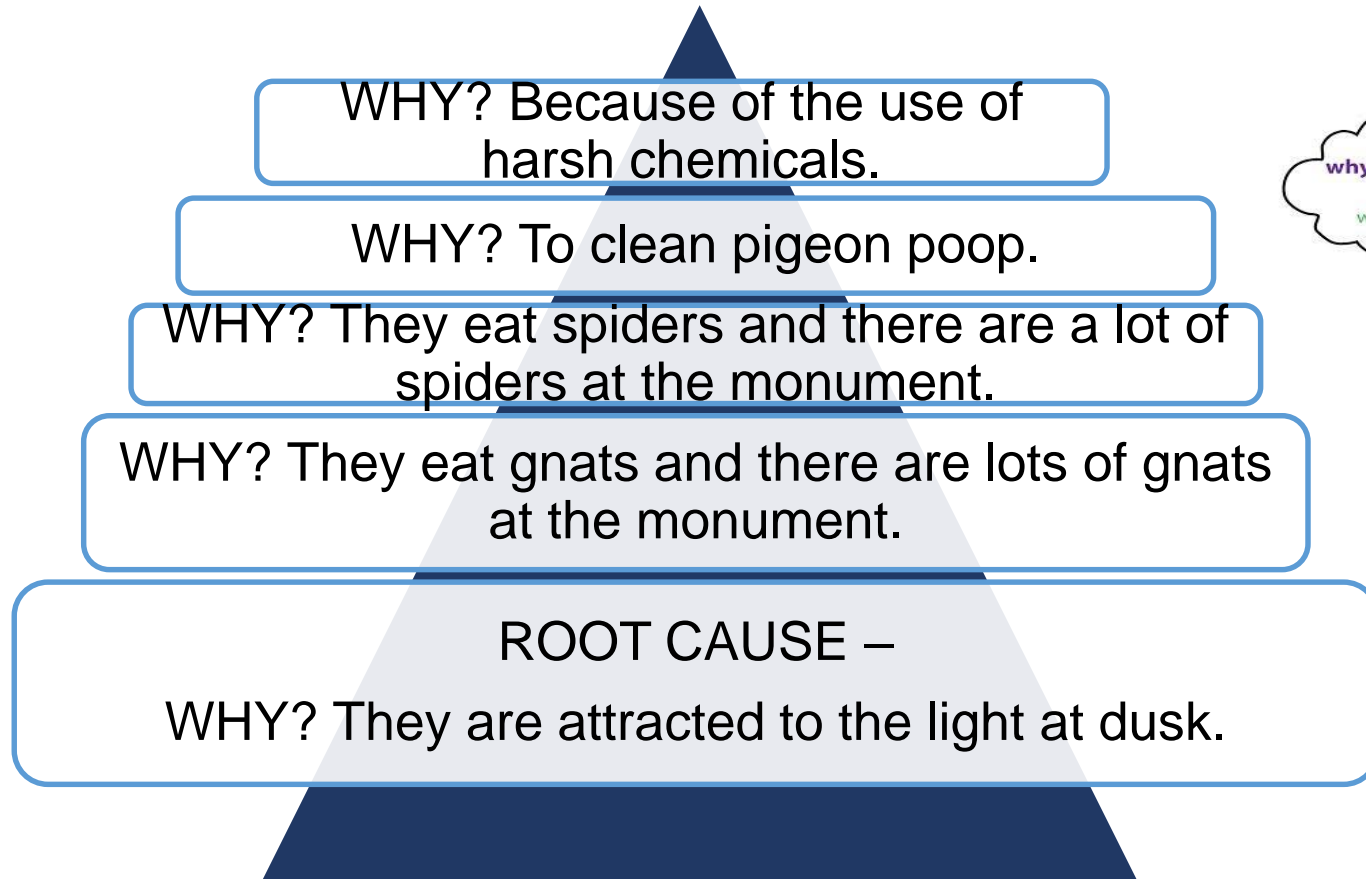
Before you attempt to "fix" any process, you must understand the root cause for the problem.

We often treat symptoms and not causes—often adding layers of policy or review to a process, rather than addressing the root cause for the defect.



Root Cause: The 5 WHY'S

Problem: The Washington Monument is disintegrating.



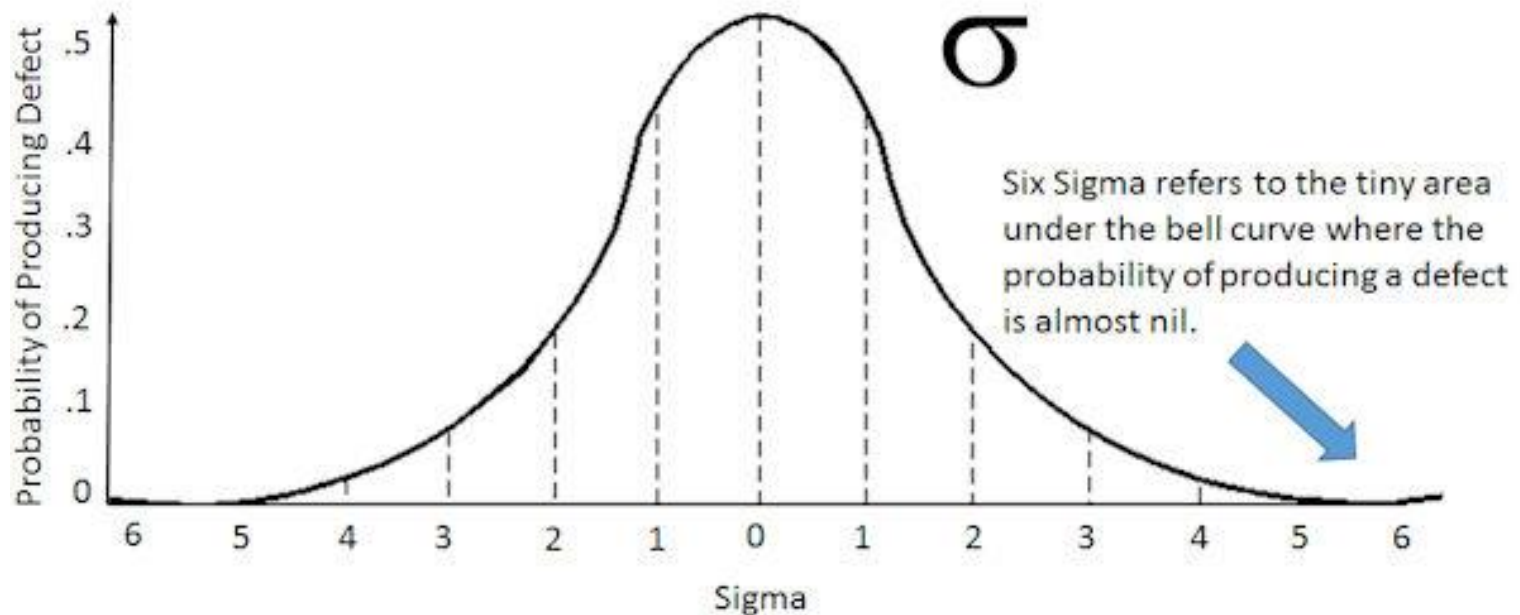
Lean: Putting it All Together

- Challenge the process by asking “Why?”
- Follow the Principles & Use the Lean tools.
- Find the root causes for your defects and non-value added steps.
- Eliminate the waste.
- Re-map your value stream.
- Implement your changes.
- Monitor and Control
- Sustain (Continuous Improvement)

Lean 6-Sigma Process

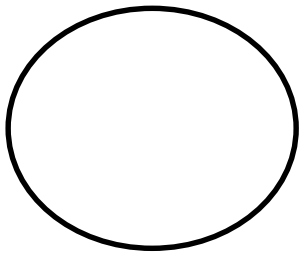
- Uses Lean principles and tools
- Used for more complex processes
- Uses statistical data to inform decisions and to monitor and control process

What is “6-Sigma”?



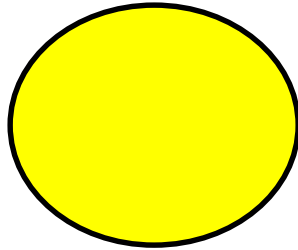
6-Sigma –	3.4 DPMO
5-Sigma =	233 DPMO
4-Sigma =	6,210 DPMO
3-Sigma =	55,807 DPMO
2-Sigma =	308,537 DPMO

6-Sigma Belts



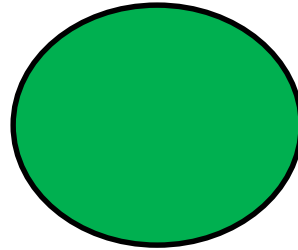
White

Intro
Level
1-Day
Training



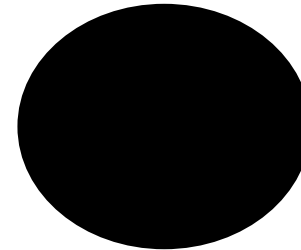
Yellow

Intro
Level
1- Week
Training



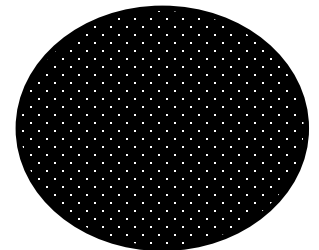
Green

Advanced
Level
3 Weeks
Training +
Ongoing
Coaching



Black

Coaches
Green
Belts



Master
Black

Coaches
Black
Belts

DMAIC: L6S Roadmap



DMAIC: L6S Roadmap

- **D**efine: Define scope of project, objectives, and metrics
- **M**easure: Measure current baseline capability, e.g., number of defects
- **A**nalyze: Analyze data for root cause, AKA “critical X’s” or inputs
- **I**mprove: Implement your solutions to address the critical X’s (root causes)
- **C**ontrol: Monitor your outputs to ensure you are within “control” limits

L6S Works!

- **Timesheets Process: \$9 M saved – One Click Process**
- **Collision Data Reporting: Now produces 2X reports**
- **DCIU: Reduced a huge backlog and now on verge of achieving their 45 days or less target**
- **DOE (Fleet Acquisition) 243 > 59 days**
- **LDO's Training Calendar: 6 months > 1 month**

L6S Update

- **Blair Thompson** is the new Chief over the Office that administers the Lean 6-Sigma Program—the Director's Office of Innovation, Risk and Strategic Management (DORISM)
- Our next cohort of L6S projects is at the selection stage.
- Project nominations will yield about 12-15 new Green Belts this cohort
- Strategic Objective is to train 30 new Green Belts in the next two years.

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Lean 6-Sigma



What is Lean 6-Sigma?

"Lean 6-Sigma" combines two very powerful methodologies into a single, integrated approach to process improvement. "Lean" was developed by the Toyota Motor Corporation in the early '60s and focuses on improving efficiencies and reducing waste. "Six Sigma" was developed by Motorola, Inc. in the mid '80s and focuses on improving quality and reducing defects through the proper use of data and metrics. Their complimentary nature has proven to be extremely effective in making rapid and transformational improvements across a wide variety of organizations and processes including transactional, service, finance, production, health care, logistics, and many others.

The Lean 6-Sigma approach is designed to produce substantial results using a data-driven, focused approach to an organization's problems. For example, many departments within organizations suffer from backlogs, delays, errors, and significant customer and employee dissatisfaction stemming from what appears to be too much work for too few people. These organizations often react to this situation by demanding more headcount (if the budget allows it) to address the problem. Instead, a Lean 6-Sigma approach is to attack the sources of inefficiencies and errors so that the same headcount can process considerably more work with virtually no defects and with a much higher level of satisfaction for both the customers and the

Lean 6-Sigma

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- [Lean 6-Sigma Roadmap](#)
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- [Roles and Responsibilities](#)
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- [Project Nomination Criteria](#)
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Lean 6-Sigma Quick Links

[Governor's Office Lean 6-Sigma Initiative](#)

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